Setup

```
PS C:\Program Files\Docker\Docker> docker pull ubuntu:16.04
16.04: Pulling from library/ubuntu
Digest: sha256:6aab78d1825b4c15c159fecc62b8eef4fdf0c693a15aace3a605ad44e5e2df0c
Status: Image is up to date for ubuntu:16.04
docker.io/library/ubuntu:16.04
```

1) Container with /bin/bash

```
PS C:\Program Files\Docker\Docker> docker run -it ubuntu:16.04 /bin/bash
root@2f49c46939c6:/#
```

2) Try running ping

```
PS C:\Program Files\Docker\Docker> docker run -it ubuntu:16.04 /bin/bash
root@2f49c46939c6:/# ping google.com
bash: ping: command not found
```

3) Updating software list

```
root@2f49c46939c6:/# apt-get update
Get:1 http://security.ubuntu.com/ubuntu xenial-security InRelease [109 kB]
Get:2 http://archive.ubuntu.com/ubuntu xenial InRelease [247 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [2051 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:5 http://archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Get:6 http://archive.ubuntu.com/ubuntu xenial/main amd64 Packages [1558 kB]
Get:7 http://archive.ubuntu.com/ubuntu xenial/restricted amd64 Packages [14.1 kB]
Get:8 http://archive.ubuntu.com/ubuntu xenial/universe amd64 Packages [9827 kB]
Get:9 http://archive.ubuntu.com/ubuntu xenial/multiverse amd64 Packages [176 kB]
Get:10 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [2559 kB]
Get:11 http://archive.ubuntu.com/ubuntu xenial-updates/restricted amd64 Packages [16.4 kB]
Get:12 http://archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [1544 kB]
Get:13 http://archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages [26.2 kB]
Get:14 http://archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [10.9 kB]
Get:15 http://archive.ubuntu.com/ubuntu xenial-backports/universe amd64 Packages [12.7 kB]
Get:16 http://security.ubuntu.com/ubuntu xenial-security/restricted amd64 Packages [15.9 kB]
Get:17 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [984 kB]
Get:18 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 Packages [8820 B]
Fetched 19.4 MB in 20s (951 kB/s)
Reading package lists... Done
```

4) Installing ping command

```
root@2f49c46939c6:/# apt-get install iputils-ping
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libffi6 libgmp10 libgnutls-openssl27 libgnutls30 libhogweed4 libidn11 libnettle6 libp11-kit0 libtasn1-6
Suggested packages:
  gnutls-bin
The following NEW packages will be installed:
  iputils-ping libffi6 libgmp10 libgnutls-openssl27 libgnutls30 libhogweed4 libidn11 libnettle6 libp11-kit0 libtasn1-6
0 upgraded, 10 newly installed, 0 to remove and 0 not upgraded.
Need to get 1307 kB of archives.
After this operation, 3781 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://archive.ubuntu.com/ubuntu xenial/main amd64 libgmp10 amd64 2:6.1.0+dfsg-2 [240 kB]
Get:2 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 libnettle6 amd64 3.2-1ubuntu0.16.04.2 [93.7 kB]
Get:3 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 libhogweed4 amd64 3.2-1ubuntu0.16.04.2 [136 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 libidn11 amd64 1.32-3ubuntu1.2 [46.5 kB]
Get:5 http://archive.ubuntu.com/ubuntu xenial/main amd64 libffi6 amd64 3.2.1-4 [17.8 kB]
Get:6 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 libp11-kit0 amd64 0.23.2-5~ubuntu16.04.2 [107 kB]
Get:7 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 libtasn1-6 amd64 4.7-3ubuntu0.16.04.3 [43.5 kB]
Get:8 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 libgnutls30 amd64 3.4.10-4ubuntu1.8 [548 kB]
Get:9 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 libgnutls-openssl27 amd64 3.4.10-4ubuntu1.8 [21.9 kB]
Get:10 http://archive.ubuntu.com/ubuntu xenial/main amd64 iputils-ping amd64 3:20121221-5ubuntu2 [52.7 kB]
Fetched 1307 kB in 8s (157 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package libgmp10:amd64.
(Reading database ... 4785 files and directories currently installed.)
Preparing to unpack .../libgmp10_2%3a6.1.0+dfsg-2_amd64.deb ...
Unpacking libgmp10:amd64 (2:6.1.0+dfsg-2) ...
Selecting previously unselected package libnettle6:amd64.
Preparing to unpack .../libnettle6_3.2-1ubuntu0.16.04.2_amd64.deb ...
Unpacking libnettle6:amd64 (3.2-1ubuntu0.16.04.2) ...
Selecting previously unselected package libhogweed4:amd64.
Preparing to unpack .../libhogweed4_3.2-1ubuntu0.16.04.2_amd64.deb ...
Unpacking libhogweed4:amd64 (3.2-1ubuntu0.16.04.2) ...
Selecting previously unselected package libidn11:amd64.
Preparing to unpack .../libidn11_1.32-3ubuntu1.2_amd64.deb ...
Unpacking libidn11:amd64 (1.32-3ubuntu1.2) ...
Selecting previously unselected package libffi6:amd64.
Preparing to unpack .../libffi6_3.2.1-4_amd64.deb ...
Unpacking libffi6:amd64 (3.2.1-4) ...
Selecting previously unselected package libp11-kit0:amd64.
Preparing to unpack .../libp11-kit0_0.23.2-5~ubuntu16.04.2_amd64.deb ...
Unpacking libp11-kit0:amd64 (0.23.2-5~ubuntu16.04.2) ...
Selecting previously unselected package libtasn1-6:amd64.
Preparing to unpack .../libtasn1-6_4.7-3ubuntu0.16.04.3_amd64.deb ...
Unpacking libtasn1-6:amd64 (4.7-3ubuntu0.16.04.3) ...
Selecting previously unselected package libgnutls30:amd64.
Preparing to unpack .../libgnutls30_3.4.10-4ubuntu1.8_amd64.deb ...
Unpacking libgnutls30:amd64 (3.4.10-4ubuntu1.8) ...
Selecting previously unselected package libgnutls-openssl27:amd64.
Preparing to unpack .../libgnutls-openssl27_3.4.10-4ubuntu1.8_amd64.deb ...
Unpacking libgnutls-openssl27:amd64 (3.4.10-4ubuntu1.8) ...
Selecting previously unselected package iputils-ping.
Preparing to unpack .../iputils-ping_3%3a20121221-5ubuntu2_amd64.deb ...
Unpacking iputils-ping (3:20121221-5ubuntu2) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
Setting up libgmp10:amd64 (2:6.1.0+dfsg-2) ...
Setting up libnettle6:amd64 (3.2-1ubuntu0.16.04.2) ...
Setting up libhogweed4:amd64 (3.2-1ubuntu0.16.04.2) ...
```

5) Pinging google.com

```
root@2f49c46939c6:/# ping google.com
PING google.com (172.217.161.142) 56(84) bytes of data.
^C
--- google.com ping statistics ---
350 packets transmitted, 0 received, 100% packet loss, time 362946ms

root@2f49c46939c6:/# exit
exit
```

Committing changes

1) Finding the container where ping is used

```
PS C:\Program Files\Docker\Docker> docker ps -a
CONTAINER ID   IMAGE         COMMAND       CREATED         STATUS                   PORTS    NAMES
2f49c46939c6   ubuntu:16.04  "/bin/bash"   19 minutes ago  Exited (1) 55 seconds ago         bold_gauss
```

2) Checking the commit help

```
PS C:\Program Files\Docker\Docker> docker commit --help

Usage:  docker commit [OPTIONS] CONTAINER [REPOSITORY[:TAG]]

Create a new image from a container's changes

Options:
  -a, --author string    Author (e.g., "John Hannibal Smith
                         <hannibal@a-team.com>")
  -c, --change list      Apply Dockerfile instruction to the created image
  -m, --message string   Commit message
  -p, --pause            Pause container during commit (default true)
```

Commiting with author, message, container ID, and repo name

```
PS C:\Program Files\Docker\Docker> docker commit -a 'Royce Yan' -m 'Added ping utility' 2f4 ryan/ping
sha256:ed2a222a143354b880930167762b7fb0c6001be62d2b02ba734a64aaa4719018
```

Checking docker images

```
PS C:\Program Files\Docker\Docker> docker images
REPOSITORY     TAG       IMAGE ID       CREATED          SIZE
ryan/ping      latest    ed2a222a1433   25 seconds ago   170MB
ubuntu         16.04     065cf14a189c   2 days ago       135MB
```

3) Running repo on bin/bash

```
PS C:\Program Files\Docker\Docker> docker run -it --rm ryan/ping /bin/bash
root@fb32ca9615ca:/# ping google.com
PING google.com (172.217.31.238) 56(84) bytes of data.
64 bytes from 172.217.31.238: icmp_seq=1 ttl=37 time=56.0 ms
64 bytes from 172.217.31.238: icmp_seq=2 ttl=37 time=56.7 ms
64 bytes from 172.217.31.238: icmp_seq=3 ttl=37 time=57.0 ms
64 bytes from 172.217.31.238: icmp_seq=4 ttl=37 time=56.3 ms
64 bytes from 172.217.31.238: icmp_seq=5 ttl=37 time=57.6 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4002ms
rtt min/avg/max/mdev = 56.004/56.754/57.616/0.567 ms
root@fb32ca9615ca:/#
```